Docket No.: 61872-8001US
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Nelson et al.

Application No.: 09/656,325 Confirmation No.: 9079

Filed: September 6, 2000 Art Unit: 3641

For: NETWORKED ELECTRONIC ORDNANCE SYSTEM Examiner: T. Chambers

CORRECTED APPEAL BRIEF

In accordance with 37 C.F.R. § 41.37(a), and in response to the Notification of Non-Compliant Appeal Brief dated September 5, 2008 Applicants submit this brief in furtherance of the Notice of Appeal filed on January 29, 2008 in the above-captioned application.

CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is PS/EMC West, LLC (also known as Pacific Scientific Energetic Materials Company), the assignee of record for the above-identified patent application.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

Applicants and Applicants' legal representative are unaware of any prior or pending appeal, interference, or judicial proceeding which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in this pending appeal.

III. STATUS OF THE CLAIMS

Claims 88-89 and 91-106 are pending in this application. Claims 88-89 have been withdrawn from consideration. Claims 91-106 are currently rejected. Claims 92-93, 96-100, and 102-106 are currently objected to under 37 C.F.R. 1.75(c).

More particularly, claims 91-100 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Claims 101-106 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 91-92, 94-95, and 97 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher[1], Abouav[2], and "applicant's admission". Claim 93 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher, Abouav, "applicant's admission", and Shann[3]. Claim 96 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher, Abouav, "applicant's admission", Shann, and Tyler[4]. Claims 98-100 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher, Abouav, "applicant's admission", and Tyler. Claims 101-103 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher, Abouav, and Shann. Claims 104-106 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boucher, Abouav,

[1] U.S. Patent No. 6,584,907
[2] U.S. Patent No. 4,860,653
[3] U.S. Patent No. 5,894,103
[4] U.S. Patent No. 4,674,047

Shann, and Tyler. Lastly, claims 91-106 stand rejected under 35 U.S.C. § 102(f) based on an alleged failure to include all known inventors in the current list of inventors.

Appellants appeal the rejections of claims 91-100 under 35 U.S.C. § 112, first paragraph, the rejections of claims 91-106 under 35 U.S.C. § 103(a), and the rejections of claims 91-106 under 35 U.S.C. § 102(f).

IV. STATUS OF AMENDMENTS

Appellants have filed no amendments subsequent to the Final Office Action dated October 30, 2007 ("the Office Action"). Accordingly, there are no amendments pending before the USPTO.

V. INTRODUCTION TO THE CLAIMED SUBJECT MATTER

The claims at issue in this appeal concern a networked electronic ordnance firing system that integrates critical safety measures for controlling the firing of pyrotechnic devices in aerospace applications, such as missiles, rockets, aircraft and spacecraft. The invention provides significant technical advances from conventional systems for preventing pyrotechnic devices from firing inadvertently.

The assignee of the pending patent application, PS/EMC West LLC, commercializes the claimed technology in its Smart Energetics Architecture platform of products (SEA^{TM}). As attested to in a declaration under 37 C.F.R. §1.132 submitted by Steven D. Nelson, a co-inventor and Vice President of Product Development at PS/EMC West LLC, the SEA^{TM} technology has enjoyed significant commercial success and acclaim directly as a result of the claimed improvements.

A. Technical Background

Pyrotechnic devices, such as explosive bolt cutters, actuators and igniters, are often used in aerospace applications to separate one structure from another, for missile guidance, for releasing one structure from a stowed position, etc. In known systems, pyrotechnic devices are coupled to electrically operated initiators for firing the pyrotechnic devices. Electronic control devices send initiation signals to control the

initiators and the corresponding pyrotechnic devices. The combination of a control unit, a plurality of pyrotechnic devices and an electrical communication system through which signals are sent from the controller to the pyrotechnic devices can be referred is known as an ordnance firing system. (*See, generally,* U.S. Patent No. 6,584,907 to Boucher et al., at 1: 15-31)

B. Summary of the Claimed Invention

Applicants' inventions are directed to networked electronic ordnance systems in which a bus controller in a network transmits arming and firing commands to a plurality of pyrotechnic devices that are also connected to the network. The bus controller transmits the arming and firing commands using digital signals having unique identifiers to designate one or more of the pyrotechnic devices to arm or fire. Each pyrotechnic device has a logic device that is associated with a unique identifier that can be pre-programmed or assigned when the networked electronic ordnance system is powered up.

In some embodiments, to improve safety by preventing inadvertent firing, the system is configured such that both digital and analog fire control conditions must be met in the logic device before a pyrotechnic device can be fired. To initiate a pyrotechnic device, the bus controller sends a first digital signal to arm the pyrotechnic device. After the pyrotechnic device is armed, the bus controller places the pyrotechnic device into a firing condition. This is performed by altering an analog condition of the network to correspond to a digital firing command. The analog condition of the bus can be altered by changing a characteristic of the electrical power transmitted across the network, such as the voltage, modulation depth or frequency. The bus controller also transmits a digital firing command signal to be received by the logic device.

On the other end of the network, the designated pyrotechnic device only fires upon detecting both the altered analog condition and the digital firing command in the logic device. The pyrotechnic device includes a bus interface that can detect when the bus controller alters the analog condition of the network. Thus, if the bus interface senses the analog condition corresponding to the firing command, and the logic device

detects the firing command, then the logic device operates the initiator to fire the pyrotechnic device.

In some embodiments, the pyrotechnic device stores activation energy upon receiving the digital arming command that includes its unique identifier. If a digital firing command is received, the activation energy is released into the initiator to fire the pyrotechnic device. If a digital disarming command is received, the activation energy is discharged, to thereby disarm the pyrotechnic device.

Rejected independent claims 91 and 101 are both directed to networked electronic ordnance systems.

1. Claim 91

Independent claim 91 is directed to "a networked electronic ordnance system" comprising "a bus controller connected to a network" and "a plurality of pyrotechnic devices connected by the network to the bus controller". Examples of these features are disclosed in the specification at p. 4, line 20 – p. 5, line 2, p. 6, lines 1-9 and 14-19, and p. 7, lines 3-5, and FIG. 2. Specifically, FIG. 2 depicts a bus controller 206 (see, e.g., accompanying description at p. 5, line 2), a cable network 204 (see e.g., accompanying description at p. 4, line 22), any a plurality of pyrotechnic devices 202 (see, e.g., p. 4, line 22).

As quoted from claim 91, the [The] bus controller is [configured] connected to a network for "(1) transmitting onto the network digital arming commands using at least one unique identifier". Examples of this feature are disclosed in the specification at p. 10, lines 9-19, and p. 16, lines 8-10, and Fig. 4, element 404.

The bus controller is also connected to the network [further configured] for "(2) altering an analog condition of the network to correspond to a firing command". Examples of this feature are disclosed in the specification at p. 19, lines 2-9, and FIG. 4, element 412.

The bus controller is further connected to the network [configured] for "(3) transmitting onto the network a digital firing command using at least one unique identifier". Examples of this feature are disclosed in the specification at p. 18, lines 18-19, and p. 19, lines 12-21, and Fig. 4, element 412.

At least one of the plurality of pyrotechnic devices comprises "a bus interface for sensing the analog condition of the network". Examples of this feature are disclosed in the specification at p. 7, lines 11-13, p. 19, lines 5-11, and FIG. 3, element 312.

The at least one pyrotechnic device further comprises "a capacitor for storing activation energy". Examples of this feature are disclosed in the specification at p. 7, lines 19-20, and p. 8, lines 4-14, and Fig. 3, element 302.

The at least one pyrotechnic device still further comprises "an initiator". Examples of this feature are disclosed in the specification at p. 7, line 20 – p. 8, line 3, and Fig. 3, element 304.

The at least one pyrotechnic device still further comprises "a logic device having a unique identifier that stores activation energy in the capacitor upon receiving a digital arming command that includes the unique identifier of its logic device". Examples of this feature are disclosed in the specification at p. 9, line 13 – p. 10, line 8, and p. 16, lines 12-21, and Fig. 3, element 300.

Once armed, the logic device "releases the stored activation energy from the capacitor into the initiator upon (1) detecting that a digital firing command is received that includes its unique identifier, and (2) determining that the bus interface senses that the analog condition of the network corresponds to the received firing command." Examples of this feature are disclosed in the specification at p. 20, lines 1-9, and Fig. 4, element 414.

2. Claim 101

Claim 101 is directed to "a networked electronic ordnance system" comprising "a bus controller connected to a network" and "a plurality of pyrotechnic devices connected by the network to the bus controller". Examples of these features are disclosed in the specification at p. 4, line 20 – p. 5, line 2, p. 6, lines 14-19, and p. 7, lines 3-5, and FIG. 2. Specifically, FIG. 2 depicts a bus controller 206 (see, e.g., accompanying description at p. 5, line 2), a cable network 204 (see e.g., accompanying description at p. 4, line 22), any a plurality of pyrotechnic devices 202 (see, e.g., p. 4, line 22).

The bus controller is connected to a network [configured] for "(1) transmitting onto the network digital arming commands using a least one unique identifier".

Examples of this feature are disclosed in the specification at p. 10, lines 9-19, and p. 16, lines 8-10, and Fig. 4, element 404.

The bus controller further is connected to a network [configured] for "(2) transmitting onto the network digital disarming commands using at least one unique identifier". Examples of this feature are disclosed in the specification at p. 17, lines 17-22, and Fig. 4, element 408.

The bus controller is still further connected to a network for [configured] "(3) transmitting onto the network digital firing commands using at least one unique identifier". Examples of this feature are disclosed in the specification at p. 18, lines 18-19, and p. 19, lines 12-21, and Fig. 4, element 412.

At least one of the plurality of pyrotechnic devices comprises "an initiator". Examples of this feature are disclosed in the specification at p. 7, line 20 – p. 8, line 3, and Fig. 3, element 304.

The at least one pyrotechnic device further comprises "a logic device" that has "a unique identifier" and "stores activation energy upon receiving a digital arming command that includes its unique identifier". Examples of these features are disclosed in the specification at p. 9, line 13 – p. 10, line 8, and p. 16, lines 12-21, and Fig. 3, element 300.

The logic device "releases the stored activation energy into its initiator when a digital firing command is received that includes its unique identifier". Examples of this feature are disclosed in the specification at p. 20, lines 1-9, and Fig. 4, element 414.

The logic device also "discharges the stored activation energy when a digital disarming command is received that includes its unique identifier." Examples of this feature are disclosed in the specification at p. 17, line 17 – p. 18, line 5.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. The rejection of claims 91-100 under 35 U.S.C. § 112, first paragraph. (See, the Office Action, p. 5, section 10.)

2. The rejection of claims 91-106 under 35 U.S.C. § 103(a). (See, the Office Action, p. 9, sections 3-8.)

3. The rejection of claims 91-106 under 35 U.S.C. § 102(f). (See, the Office Action, p. 8, section 14.)

4. The rejection of claims 101-106 under 35 U.S.C. § 112(2) (See, the Office Action, p. 8, section 11-12.)
5. Miscellaneous objections to the drawings, specification and dependent claims. (See, the Office Action, p. 2-5)

VII. ARGUMENTS

A. Introduction

The October 20, 2007 Final Office Action rejects pending claims 91-100 for two primary bases that, as applied, are contradictory. According to the Office Action, the claims are rejected as being obvious because the Applicants "admitted" that in a computer network, a bus interface and a logic device connected the bus interface are both well known in the art. The Office Action then rejects the same claims as allegedly failing to enable a bus interface and logic device. This cannot be the case.

Claims 91-100 are enabled and are not obvious. These claims are not directed simply to a bus interface and a logic device, which are network components well known to any network engineer. Instead, the claimed inventions concern a networked electronic ordnance system that uses a logic device in a network pyrotechnic device to achieve a critical safety measure. Particularly, the logic device requires two events to occur in order to fire the pyrotechnic device. Before a pyrotechnic device fires, the logic device must detect both that an appropriate digital firing signal was received and also that the analog condition of the network was altered. This provides much more effective protection against inadvertent firings than any existing ordnance system.

Claims 101-106 also are not obvious. These claims are also directed to a networked electronic ordnance system having a plurality of pyrotechnic devices. In these claims, the logic device releases stored activation energy into an initiator to fire when a digital firing command is received that includes its unique identifier, and discharges that activation energy (to disarm) when a digital disarming command is received that includes its unique identifier. In this manner, the claimed ordnance system provides a particular benefit by allowing the network to selectively disarm one or more pyrotechnic devices. Such use of digital signaling for selectively disarming a pyrotechnic device, as opposed to system-wide abort signals, are not known in the prior art.

B. Claims 91-100 Comply With the Enablement Requirement Under 35 U.S.C. § 112, First Paragraph

The Office Action rejected claims 91-100 for allegedly "failing to comply with the enablement requirement". (See, the Office Action, p. 5, section 10) In making this rejection, the Office Action states the following:

> Claim 91 requires that a bus interface sense an analog condition of a network. Neither the applicant's specification nor drawings describe how or in what manner this is accomplished. In the specification, applicant admits that a bus interface is known in the art. However, *at no point in the specification does the applicant attempt to distinguish what was admitted to be known from that which is alleged to be new.* This amounts to a failing under 35 U.S.C. § 112, first paragraph because the applicant has not enabled one having ordinary skill in the art to make or use the claimed invention.

(Id., emphasis added)

This rejection is improper for at least the following reasons: (1) the Office Action applies an erroneous standard for determining enablement, and (2) the specification

and drawings enable a person skilled in the art to practice the invention without undue experimentation, as required under the proper standard.

1. The Office Action Applies An Incorrect Standard Under 35 U.S.C. § 112, First Paragraph And The Finding Of No Enablement Improperly Flows From That Incorrect Standard

As a first matter, there is no requirement that the specification explain what already was known in order for a claim to be enabled. Instead, the pertinent statute, 35 U.S.C. § 112, first paragraph, provides that the specification must enable one skilled in the art to practice the invention without undue experimentation. This is explained in MPEP 2164.01(a) as follows:

> The standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916) which postured the question: is the experimentation needed to practice the invention undue or unreasonable? That standard is still the one to be applied. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)... See also *United States v. Telectronics, Inc.*,857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988) ('The test for enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation.')...a patent need not teach, and preferably omits, what is well known in the art.

Under this standard, Applicants need not "distinguish what was admitted to be known from that which is alleged to be new," as suggested by the Office Action. Distinctions of this sort pertain to novelty requirements, not enablement. Thus, the Examiner's rejection of claims 91-100 under 35 U.S.C. § 112, first paragraph, is based on requirements that are inconsistent with existing USPTO practice and established legal precedent. Because the rejection is based on an erroneous standard, the rejection is unwarranted and should be reversed.

2. Under The Correct Standard, The Claims Are Enabled

Second, under the appropriate standard, the specification does in fact enable one of ordinary skill in the art to practice the claimed invention.

By the specification, the inventors do not purport to have invented a bus

interface. As stated in the specification, "bus interfaces are well known to those skilled in the art." (specification, p. 7, ln13.) The specification explains that a "bus interface" is an electronic component that accepts signals from a bus or cable network. (See, e.g., specification p. 7, lines 11-13, and Fig. 3, element 312) As disclosed, an example bus interface 312 comprises "an electronic component that preferably accepts signals from the cable network 204 before those signals are passed further into the pyrotechnic device 202." (Id.)

The inventors also have not invented an "analog condition." The specification further explains that an "analog condition" of a network refers to a *characteristic of electrical power transmitted across a cable network*, or bus of the network. (See, specification, p. 19, lines 5-7, emphasis added) The use of the word "analog" distinguishes this condition from digital signaling transmitted on the bus to communicate control signals, such as the firing signal. The specification presents various examples of analog conditions that can be sensed by bus interface 312, including voltage, modulation depth, or frequency of an electrical power signal that is being transmitted on the cable network 204. (See, specification, p. 19, lines 5-11.) The specification provides that any of these analog conditions can be altered by a bus controller 206 or other conventional circuitry, which sends the signals received and sensed at the bus interface using well-known, conventional analog circuitry. (See, specification, p. 19, lines 2-3)

Thus, the specification discloses that bus interfaces were known for accepting signals from a network and that it was known to modify an analog condition of the network, such as by changing the voltage level of the signal that will be received by the bus interface. The specification also discloses "what is new" – configuring a logic device that is connected to the bus interface so that the logic device will not initiate a pyrotechnic device until both the analog condition has been changed and the digital firing command has been received.

In view of the above disclosure in the specification, one skilled in the art would have been able, without undue experimentation, to make and use "a bus interface for

sensing the analog condition of the network". Further evidence for the enablement of this feature can be found in a variety of sources already before the Examiner, including, e.g., the Inventor's declaration submitted on August 24, 2007.

In the declaration submitted on August 24, 2007, inventor Steven D. Nelson described various analog conditions and explained that a technician skilled in the art at the time of the invention would "know how to change a voltage, modulation depth, or frequency of a network to alter an analog condition of the network." (See, Declaration dated August 24, 2007, p. 4, paragraph 13) Mr. Nelson further explained that the technician would "know how to sense that an analog condition of the network has been altered." (Id.) Based on this and other knowledge possessed by the skilled technician, Mr. Nelson concluded that "[b]ased on the disclosure in the specification, one of ordinary skill in the art at the time of the invention would have been enabled to make and/or use the invention." (Id.)

In fact, even the Boucher reference applied in the prior art rejections discloses that signals can be communicated at two different voltage levels in a pyrotechnic electronic communications system. The fundamental difference is that Boucher does not disclose a logic device configured to release stored activation energy from a capacitor into an initiator upon detecting that both a digital firing command is received and that the bus interface senses that the analog condition of the network corresponds to the received firing command.

Because the Office Action has relied on an erroneous standard in rejecting the claims under 35 U.S.C. § 112, and because the disclosure of Applicants' application would enable a person of ordinary skill in the art to make and use a networked ordnance system having a bus interface capable of sensing an analog condition, the rejection of claims 91-100 under 35 U.S.C. § 112, first paragraph is improper and should be reversed.

C. Claims 91-106 Are Not Unpatentable As Obvious Under 35 U.S.C. § 103(a)

The Office Action rejected claims 91-100 as being unpatentable under 35 U.S.C. § 103(a) based on the combined teachings of Boucher, Abouav and certain other references. The Office Action rejected claims 101-106 as being unpatentable under 35 U.S.C. § 103(a) based on the combined teachings of Boucher, Abouav, Shann and certain other references. The claims overcome the stated rejections for reasons presented below.

1. Summary of Boucher, Abouav, and Shann

Boucher discloses an ordnance firing system in which communication signals are carried at a first voltage and arming signals are provided at a second, higher voltage. (See, Boucher, Abstract) Boucher describes that the communication signals are carried at a lower voltage that is "preferably lower than the no-fire threshold of the initiators" so that "test and programming signals that are not intended themselves to arm and/or initiate the initiators are carried out at a level that is insufficient to arm and/or initiate the initiators even if the communication signals are somehow misinterpreted." (See, Boucher, column 11, lines 1-6.) Boucher further describes that "the energy for arming the initiators may be provided at a higher level than the communication signal level" – 28 volts instead of 7 volts. (See, Boucher, column 11, lines 7-9.) Thus, Boucher alters an analog condition of a network so that communication signals are communicated at a low voltage that is insufficient to fire the initiators, and arming signals are communicated at a higher voltage analog condition that is sufficient to arm or initiate the initiators.

Abouav discloses actuators designed for use in conjunction with detonator assemblies. (See, Abouav, Abstract) The actuators control actuation of the detonator assemblies in response to input signals from a control device. (See, Abouav, col. 1, lines 37-43) When one of the actuators receives an input signal from the control device, the actuator generates an output arm signal to arm a corresponding detonator assembly, waits for a predetermined delay period, and then generates an output actuate

signal to cause explosive actuation of the detonator assembly. (See, Abouav, col. 1, lines 43-49)

Shann discloses a detonator firing circuit comprising a control unit and a plurality of detonator units. (See, e.g., Shann, Abstract) The control unit transmits various signals to the detonator units to control their operation. (See, e.g., Shann, col. 3, lines 43-49) Among these signals are "fire" signals for detonating the detonator units, and "abort" signals for neutralizing the detonator units such that they no longer detonate upon receiving "fire" signals. (See, Shann, col. 3, line 57 through col. 4, line 7)

2. Analysis of Claims

a. Independent Claim 91

The Office Action rejected independent claim 91 under 35 U.S.C. § 103(a) based on Boucher in view of Abouav and "applicant's admission". Claim 91 overcomes this rejection for at least the following reasons.

Claim 91 recites a networked electronic ordnance system comprising a bus controller and a plurality of pyrotechnic devices connected to the bus controller through a network. The pyrotechnic devices include a bus interface for sensing the analog condition of the network, and a logic device that releases stored activation energy into an initiator upon detecting that (1) a digital firing command is received that includes its unique identifier, and (2) determining that the bus interface senses that the analog condition of the network corresponds to the received firing command.

Boucher is directed to an ordnance firing system in which communication signals are carried at a first voltage and arming signals are provided at a second, higher voltage. (Boucher, Abstract.) Boucher describes that the communication signals are carried at a lower voltage that is "preferably lower than the no-fire threshold of the initiators" so that "test and programming signals that are not intended themselves to arm and/or initiate the initiators are carried out at a level that is insufficient to arm and/or initiate the initiators even if the communication signals are somehow misinterpreted." (Boucher, column 11, lines 1-6.) Boucher further describes that "the energy for arming

the initiators may be provided at a higher level than the communication signal level" – 28 volts instead of 7 volts. (Boucher, column 11, lines 7-9.)

Thus, Boucher alters the analog condition of the network so that communication signals are communicated at a low voltage that is insufficient to fire the initiators, and arming signals are communicated at a higher voltage analog condition that is sufficient to arm or initiate the initiators.

While Boucher's pyrotechnic devices each includes an addressable logic device to detect digital, addressable commands, Boucher's logic devices do not "determine that the bus interface senses that the analog condition of the network corresponds to the received firing command," as recited in claim 91.

Accordingly, Boucher fails to teach the important aspect recited in claim 91 that enhances safety. While Boucher discloses transmitting an arming signal and a firing signal, the reference fails to disclose a logic device that will only fire if it both (1) detects the digital firing command and (2) determines that the bus interface senses that the analog condition of the network corresponds to the received firing command.

Figure 3 of Boucher illustrates the failings in the prior art. As can be seen, multiple ARM commands are received, each of which incrementally raises the capacitor firing voltage as a partial charge, before it drains out through a bleed resistor. To fire, enough ARM commands have to be received so that the capacitor reaches a sufficiently high voltage. Boucher describes that:

> Once armed, i.e., once firing capacitor 26 is charged sufficiently to initiate the initiation element in the initiator, the periodic arm commands must continue in order to maintain the sufficient charge in capacitor 26.

(Boucher, column 14, line 53 – 57.) Thus, in Boucher, the pyrotechnic device fires when a firing signal is detected and enough ARM signals are transmitted to charge the capacitor to a sufficient level to initiate the initiation element. In other words, when the firing signal is received, the pyrotechnic device will attempt to initiate the initiation element, but if the capacitor has not been charged sufficiently, it will not work.

In contrast, claim 91 recites a safety mechanism that is far more secure. The claimed pyrotechnic device does not alter the analog condition of the network to arm the device, but rather, it alters the analog condition of the network as a third condition, which is sensed by the bus interface, and then used by the logic device to determine whether the analog condition of the bus corresponds to the received firing command.

The rejection of claim 91 in the Office Action combines Boucher with Abouv and an alleged admission by the Applicants. As stated in the Office Action, Abouv discloses detonator assemblies having a microcomputer with a memory that stores an arm code and an actuate code. The Office Action concludes that "at the time of the invention, one having ordinary skill in the art would have found it obvious to provide ordnance system of Boucher with the digital signal sending and receiving capabilities of Abouv."

Like Boucher, Abouv also does not disclose a bus interface for sensing an analog condition of a bus. Furthermore, like Boucher, Abouv discloses a logic device for detecting digital commands, but the reference does not teach that the logic device can determine whether the analog condition of the network corresponds to the received firing command. Thus, Abouv does not add any relevant teaching beyond Boucher.

Lastly, the Office Action combines an alleged admission by Applicants. Particularly, the Office Action states that "Applicant's specification (pg. 7, ll. 10-14) describes a bus interface and provides that such an interface is well known to those skilled in the art." By this statement, Applicants were merely stating that bus interfaces were well-known to be "an electronic component that preferably accepts signals from the cable network 204 before those signals are passed further into the pyrotechnic device 202." By this statement, Applicants were not admitting that it was known to use a logic device to determine that the bus interface senses the analog condition corresponding to the firing command, as recited in claim 91 and disclosed on page 20, lines 10-11 of the application.

b. Independent Claim 101

Independent claim 101 is directed to a networked electronic ordnance system comprising a logic device having a unique identifier that stores activation energy upon receiving a digital arming command that includes its unique identifier, and (i) releases the stored activation energy into its initiator when a digital firing command is received that includes its unique identifier, and (ii) discharges the stored activation energy when a digital disarming command is received that includes its unique identifier.

The Office Action acknowledges that neither Boucher nor Abouav discloses a digital disarming command. (See, the Office Action, p. 12, section 7.) However, the Office Action compares the claimed digital disarming command with an abort command in Shann, stating, "Shann discloses an abort command that can be issued to discharge energy stored in a capacitor when it is no longer desired to fire an ordnance device" (Id.) For at least the following reasons, the abort command of Shann does not constitute a digital disarming command including a unique identifier as recited in claim 101.

Shann teaches that the "abort" signal is a "type 2" signal, or in other words, a signal that is simultaneously broadcast to the plurality of detonator units. (See, e.g., Shann, col. 4, lines 1-7; see also, Shann, col. 3, lines 19-28) Accordingly, Shann's abort signal does not include a unique identifier as recited in claim 101. Because Shann fails to disclose a disarming command including a unique identifier, the Office Action's proposed combination of Boucher, Abouav, and Shann does not include each element recited in claim 101. Accordingly, the Office Action's rejection of claim 101 is improper and should be reversed.

In response to Applicants' previous arguments regarding claim 101, the Office Action notes that "Boucher provides the unique identifier limitation". (See, the Office Action, p. 15) However, in view of the Office Action's previous acknowledgment that Boucher does not disclose a digital disarming command, it would appear that the Office Action is asserting that Boucher provides a unique identifier in a command or signal other than a digital disarming command. In that case, it would seem that the Office

Action's obviousness case relies on a tacit assumption that the presence of a unique identifier in one type of command or signal makes it obvious to include a unique identifier in all other types of commands or signals. However, as demonstrated by Shann's "type 1" signals (with identifiers) and Shann's "type 2" signals (without identifiers), it is not obvious to include a unique identifier in every signal. Absent evidence to the contrary, the Office Action's rejection of claim 101 under 35 U.S.C. § 103(a) is improper and should be reversed.

Appellants further note that the Office Action has failed to provide any "articulated reasoning" in support of its proposed combination of Boucher, Abouav, and Shann, as required by recent judicial precedent. (See, *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007).) Accordingly, the Office Action has failed to establish a prima facie case of obviousness and therefore the rejection of claim 101 under 35 U.S.C. § 103(a) should be reversed.

c. Dependent claims 92-100 and 102-106

Claims 92-100 depend from independent claim 91 and are therefore patentable over the Office Action's proposed combinations of references for at least the reasons presented above in relation to independent claim 91. Claims 102-106 depend from independent claim 101 and are therefore patentable over the Office Action's proposed combinations of references for at least the reasons presented above in relation to independent claim 101.

D. The rejection of claims 91-106 under 35 U.S.C. § 102(f)

The Office Action rejected claims 91-106 under 35 U.S.C. § 102(f), stating that "the applicant did not invent the claimed subject matter." (See, the Office Action, p. 8, section 14) The Office Action explains that this rejection is based on the absence of John J. Walsh on the list of current inventors. (Id.)

Applicants have complied with the requirements of 37 C.F.R. § 1.48 for adding John J. Walsh to the list of current inventors. However, the Examiner has refused to allow this addition. To the extent that the Examiner's refusal to add John J. Walsh to

the list of inventors is improper, the rejection of claims 91-106 under 35 U.S.C. § 102(f) is unwarranted and should be reversed.

Relevant facts regarding Applicants' compliance with 37 C.F.R. § 1.48 are as follows. On April 19, 2001, Applicants' filed a petition requesting to correct inventorship under 37 C.F.R. § 1.48 by adding John J. Walsh as an inventor. At the time of the filing, Special Devices, Inc. was the assignee of record. The April 19, 2001 filing included (i) a copy of the assignments of the named inventors, Steven D. Nelson and Michael N. Diamond, to Special Devices, Inc., (ii) a new declaration signed by Steven D. Nelson, Michael N. Diamond, and John J. Walsh, and (iii) written consent of the assignee at the time, Special Devices, Inc.

On July 18, 2001, Special Devices, Inc. assigned all rights, title and interest in and to the patent application to PS/EMC West, LLC. On June 9, 2005, John J. Walsh assigned his interest in the patent application to Special Devices, Inc., and its successors and assigns, which is PS/EMC West LLC, via the July 18, 2001 assignment agreement.

In a submission filed on August 24, 2007, Applicants included written consent of the current assignee, PS/EMC West LLC, to correct inventorship by adding John J. Walsh as an inventor. With that consent, together with previous submissions, Appellants have complied with the requirements for correction of inventorship under 37 C.F.R. § 1.48.

Because Applicants have complied with the requirements to add John J. Walsh as an inventor, the Examiner's refusal to add Mr. Walsh to the list of current inventors is improper. Accordingly, Applicants respectfully request reversal of the rejection of claims 91-106 under 35 U.S.C. § 102(f). Furthermore, on today's date, Applicants are re-filing a Petition to Correct Inventorship.

E. Claims 101-106 Are Not Indefinite

Claim 101 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the use of the term "its" in the last paragraph of the claim. The Office Action states that

Specifically, the pertinent portion of the claim recites:

> ... a logic device having a unique identifier that stores activation energy upon receiving a digital arming command that includes its unique identifier, and
>
> (A) releases the stored activation energy into its initiator when a digital firing command is received that includes its unique identifier, and
>
> (B) discharges the stored activation energy when a digital disarming command is received that includes its unique identifier.

From the context of this claim language, it readily can be discerned that "its unique identifier" is referring to the unique identifier associated with the logic device. Accordingly, Applicants respecfully submit that these claims are not indefinite or vague.

F. The Drawings, Specification And Dependent Claims Are Not Objectionable

The Final Office Action additionally objects to the drawings under 37 CFR 1.83(a), the specification under 37 CFR 1.71(a), and the dependent claims under 37 CFR 1.75(c). Applicants respectfully submit that the drawings, specification and dependent claims are not objectionable.

1. The Drawings Show The Configuration Of The Claimed System

The Final Office Action states that "the means by which the bus interface senses the analog condition of the network and the means by which a logic device determines that a bus interface senses the analog condition must be shown or the feature(s) canceled from the claim(s)." These features are already shown in the figures.

Figure 2 in the specification illustrates the overall configuration of a networked ordnance system as recited in the claims. Particularly, a bus controller 206 is presented, connected via a cable network 204 to a plurality of pyrotechnic devices 202.

The claims additionally recite that the pyrotechnic devices include a bus interface and logic device. As provided above, bus interfaces and logic devices in networked systems are well known, as Applicants stated in the specification. Figure 3 in the application represents in block form the arrangement of a pyrotechnic device 202 connected to a cable network via a bus interface 312, which in turn is connected to a logic device 300, which is then connected to an initiator 304. Accordingly, this figure illustrates the configuration of the pyrotechnic device such that the bus interface senses the analog condition of the network (via its direct connection to the cable network) and the logic device determines that the bus interface senses the analog condition (via its direct connection to the bus interface).

Accordingly, Applicants respectfully submit that the drawings in their present form show every feature of the invention as specified in the claims.

2. The Specification Provides Adequate Written Description And Is Enabling

The Final Office Action objects to the specification under 37 CFR 1.71(a) for allegedly failing to disclose "in what manner the bus interface 'senses' the analog condition," or "how or in what manner the claimed bus interface differs." This objection essentially mirrors the rejection of claims 91-100 under 35 U.S.C. § 112, first paragraph, which was addressed above. A bus interface for connecting to a network was well known at the time of the invention. By definition, a bus interface receives a signal, which can convey information in a digital and analog form.

3. The Dependent Claims Are Not Objectionable

Finally, the Final Office Action objects to the dependent claims as being "of improper dependent form for failing to limit the subject matter of a previous claim." The

claims, however, are in proper dependent form, which each explicitly reciting to which claim it depends. Particularly, claims 92-95 and 97-100 each depends directly from independent claim 91, and claim 96 depends from dependent claim 93. Claims 102-106 each depends directly from claim 101. Further, each of the dependent claims refers back to "[t]he networked electronic ordnance system" recited in either independent claim 91 or 101.

II. CONCLUSION

Based on the foregoing remarks, Applicants respectfully submit that claims 91-106 overcome all outstanding rejections. In particular, claims 91-100 overcome the rejections under 35 U.S.C. § 112, first paragraph based on the claims' enablement and the Office Action's reliance on an improper enablement standard. Claims 91-106 overcome the rejections under 35 U.S.C. § 102(f) based on Applicants' compliance with the requirements for adding an inventor and the impropriety of the Examiner's refusal to enter an inventor to the current list of inventors. Claims 91-100 overcome the corresponding rejections under 35 U.S.C. § 103(a) based on the failure of Boucher and Abouav to teach a bus interface that senses that an analog condition of a network corresponds to a firing command as claimed, and the references' failure to teach altering an analog condition of a network to correspond to a firing command as claimed. Claims 101-106 overcome the corresponding rejections under 35 U.S.C. § 103(a) based on the failure of Boucher, Abouav, and Shann to teach a digital disarming command that includes a unique identifier as claimed.

Accordingly, for the reasons provided above, applicants respectfully request reversal of the rejections of claims 91-106.

Dated: October 6, 2008

Respectfully submitted,

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VIII. CLAIMS APPENDIX

This section includes a copy of the claims involved in this appeal, as required by 37 C.F.R. § 41.37(c)(1)(viii).

91. A networked electronic ordnance system, comprising:

a bus controller connected to a network for (1) transmitting onto the network digital arming commands using at least one unique identifier, (2) altering an analog condition of the network to correspond to a firing command, and (3) transmitting onto the network a digital firing command using at least one unique identifier; and

a plurality of pyrotechnic devices connected by the network to the bus controller, at least one pyrotechnic device comprising:

a bus interface for sensing the analog condition of the network,

a capacitor for storing activation energy,

an initiator, and

a logic device having a unique identifier that stores activation energy in the capacitor upon receiving a digital arming command that includes the unique identifier of its logic device, and, once armed, releases the stored activation energy from the capacitor into the initiator upon (1) detecting that a digital firing command is received that includes its unique identifier, and (2) determining that the bus interface senses that the analog condition of the network corresponds to the received firing command.

92. The networked electronic ordnance system of claim 91, wherein an analog condition of the network can be its voltage level, modulation depth, or frequency.

93. The networked electronic ordnance system of claim 91, wherein the at least one pyrotechnic device discharges the stored activation energy when a digital disarming command is received that includes the unique identifier of its logic device.

94. The networked electronic ordnance system of claim 91, wherein the plurality of pyrotechnic devices are integrated into a missile.

95. The networked electronic ordnance system of claim 91, wherein the plurality of pyrotechnic devices are integrated into an aircraft.

96. The networked electronic ordnance system of claim 93, wherein after a disarming command has been acted upon in the pyrotechnic device, the pyrotechnic device responds to the bus controller by transmitting its disarmed status over the network.

97. The networked electronic ordnance system of claim 91, wherein the bus controller generates the digital arming command.

98. The networked electronic ordnance system of claim 91, wherein after an arming command has been acted upon in the pyrotechnic device, the pyrotechnic device responds to the bus controller by transmitting its armed status over the network.

99. The networked electronic ordnance system of claim 91, wherein the bus controller periodically queries pyrotechnic devices at regular intervals to confirm that firing capability in the device remains intact.

100. The networked electronic ordnance system of claim 91, wherein the bus controller determines network status by transmitting a network signal to one or more pyrotechnic devices and then sensing whether the signal is echoed back in response.

101. A networked electronic ordnance system, comprising:

a bus controller connected to a network for (1) transmitting onto the network digital arming commands using a least one unique identifier, (2) transmitting onto the network digital disarming commands using at least one unique identifier, and (3) transmitting onto the network digital firing commands using at least one unique identifier, and

a plurality of pyrotechnic devices connected by the network to the bus controller, at least one pyrotechnic device comprising:

an initiator, and

a logic device having a unique identifier that stores activation energy upon receiving a digital arming command that includes its unique identifier, and

(A) releases the stored activation energy into its initiator when a digital firing command is received that includes its unique identifier, and

(B) discharges the stored activation energy when a digital disarming command is received that includes its unique identifier.

102. The networked electronic ordnance system of claim 101, wherein the plurality of pyrotechnic devices are integrated into a missile.

103. The networked electronic ordnance system of claim 101, wherein the at least one pyrotechnic device includes an energy reserve capacitor for storing activation energy in the device, and the capacitor charges from current transmitted in the network upon receiving the digital arming command.

104. The networked electronic ordnance system of claim 101, wherein after a disarming command has been acted upon in the pyrotechnic device, the pyrotechnic device responds to the bus controller by transmitting its disarmed status over the network.

105. The networked electronic ordnance system of claim 101, wherein the bus controller periodically queries pyrotechnic devices at regular intervals to confirm that firing capability in the device remains intact.

106. The networked electronic ordnance system of claim 101, wherein the bus controller determines network status by transmitting a network signal to one or more pyrotechnic devices and then sensing whether the signal is echoed back in response.

IX. EVIDENCE APPENDIX

[None]

X. RELATED PROCEEDINGS INDEX

[None]